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INTER-OFFICE CORRESPONDENCE

Richmond, Virginia

To: .J. Schardt/A. Palmer Date: October 11, 1988

From: .R. Prasad R. Prasad/a

Subject: .PM 1294 - NICOTINE REDUCTION WITH AB

Per my conversation with Ken Sonnenfeld of Fish & Neave, the attached clarification/data is being forward on PM 1294.

attachment

cc: H. Alonso
H. Grubbs
K. Sonnenfeld, Fish & Neave, 875 Third Avenue, New York, NY 10022

C88-08926

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CLARIFICATION ON PM 1294 (OCTOBER 7, 1988)

Q. Are there alternatives to AB and amino sugars?
A. None known to me. Recommend contacting Harvey.

Q. What is the ideal temperature range for AB solution?
A. AB solution is stable up to 90°F. Beyond that temperature, it starts to convert to NH_4OH, as indicated by the increase in the solution pH.

Q. Is there evidence that we are applying AB and not ammonia to the filler?
A. The preparation of AB solution is designed to assure that it does not convert into ammonia. The solution pH in the AB tank is about 7.8 pH. The pH of AB solution collected after the spray nozzle in the ordering cylinder is 7.8-8.0 pH range. The pH of ammonia would be significantly higher. Therefore, the filler is treated with AB and not ammonia.

Q. Is AB solution stable during application?
A. Tests indicate that AB converts to ammonia under the following conditions:
- in an open tank at low temperatures over a long period of time, i.e., pH rises from 7.8 to 8.3 in 3 hours at 58°F temperature (AB solution concentration 14.7%).
- in an open tank at low temperature and high shear/agitation, i.e., pH rises to 8.8 pH in 3 hours at 68°F.
- in an open tank at high temperature, i.e., pH rises to 8.8 pH instantaneously, as AB solution is prepared at 100°F.

The AB solution stability was assured via making the following design modifications to the AB application system:

1. Careful control of AB solution temperature in the tank (50°F to 90°F range) to maintain 1°F to 8°F above the solubility limit for the concentration being applied.

2. Use of gaseous CO_2 pressure above the solution to maintain 7.8 pH in the tank (40-50 psi pressurized CO_2 tank).

3. Elimination of the transfer pump for spray application, by utilizing CO_2 pressure to force the AB solution to the application point.

NOTE: The stability of AB solution @ 15% concentration was confirmed in a 23 hour test via using a pressurized CO_2 tank @ 40 psi pressure, in the temperature range of 59°F to 82°F.

Q. What is the mechanism of AB treatment to tobacco?
A. AB gently treats the filler with a base at low pH of 7.8 pH. This avoids any harsh reaction conditions or browning reactions. AB remains as AB on tobacco until it reaches an acid "site" to gently react with a number of acids in tobacco. It displaces nicotine from its salt form and the free base nicotine is available for subsequent removal.

Q. Does AB convert to ammonia in the dryer?
A. The AB reacted to displace the nicotine from salt form is chemically locked-in as $-NH_4$. It does not volatilize as free ammonia. The excess

AB, if any, will convert to free ammonia in the dryer and will be volatile. At AB addition level of 2% to 3% on tobacco, all the applied AB is present in the filler in ammonia ($-NH_4$) form and therefore none of it is lost in the dryer.

Q. Type of dryer and manufacturer?
A. Hambro dryer is best suited for the process. It is made by Hambro Company and it uses a fluidized bed principle to treat the tobacco. Alternatively, rotary type dryers may be used, i.e., ADT, Legg dryers.

Q. Will ammonia carbonate work?
A. Yes, but flavor may be adversely affected. Recommend contacting H. Grubbs.

Q. Are there apparatus design claims?
A. Possibly. Standard dryers may work only partially (10-15% nicotine reduction). Novelty may be in modifying standard dryers to treat tobacco <u>without</u> drying. This will require air stream to be controlled for temperature <u>and</u> humidity.

Q. What is best pH range for AB solution?
A. For AB solution: 7.5 pH to 8.2 pH
For ordered tobacco: 6.8 pH to 7.2 pH